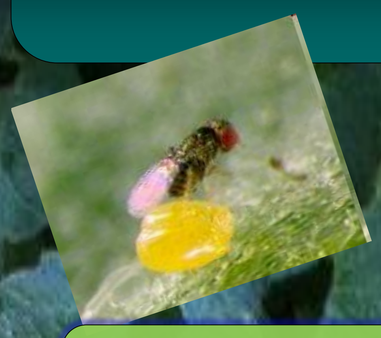
Ecotoxicity of insecticides commonly used on tomato crops on the natural enemy *Trichogramma achaeae* Nagaraja & Nagarkatti (Hymenoptera: Trichogrammatidae)



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Introduction & Objectives

Since *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) was detected in 2006 as a new pest in tomato crops in Spain, several natural enemies have been reported to control this pest.

The main goal of this work was to evaluate lethal and sublethal effects of insecticides commonly applied on tomato crops on adults of the spanish autochthonous parasitoid *Trichogramma achaeae*. The following parameters were evaluated:

- **Mortality (%) at 24, 48 & 72h**
- **Beneficial capacity:**
  - **Parasitized eggs (%)**
  - **Parasitism (eggs/female/day)**
- **Parasitoid emergence (%)**

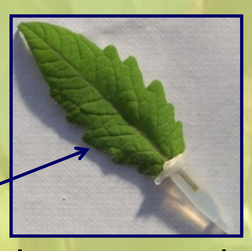
Material & Methods

Active Ingredient (ai)	Concentration (cp)*	Comercial name	ai (%) Formulation	Trade company
Emamectin benzoate	150 g/hl	AFFIRM®	0,855 SG	Syngenta Agro
Imidacloprid	75 cc/hl	CONFIDOR®	20 LS	Bayer
***Bacillus thuringiensis* subsp. Kurstaki**	50 g/hl	COSTAR®	18 WG	Syngenta Agro
***Bacillus thuringiensis* subsp. Kurstaki**	100 g/hl	BACTUR 2X®	32 WP	C. Q. Massó

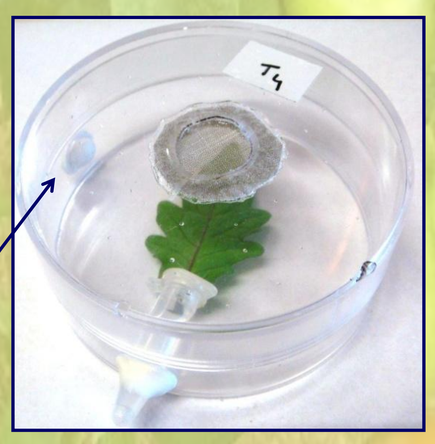
***cp: comercial product**

Evaluation of mortality

Spray of tomato plants



Adults were exposed to fresh residues on leafs



Exposure cage

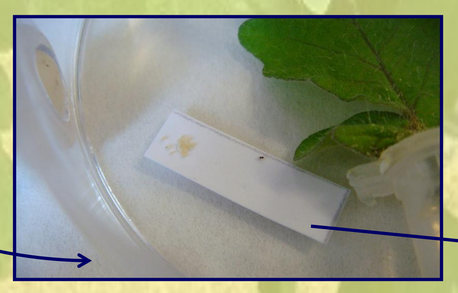
Assay 1 — 5 Adults per replicate; 15 Replicates per compound (commercial insects)

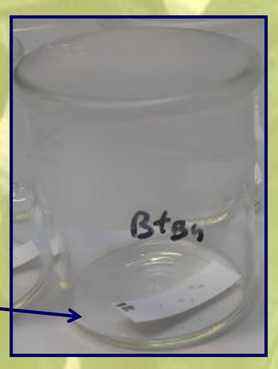
Assay 2 — 4 Adults (2♂/2♀) per replicate; 20 Replicates per compound (laboratory reared insects)

Evaluation of beneficial capacity

Only for laboratory reared insects

Assay 2



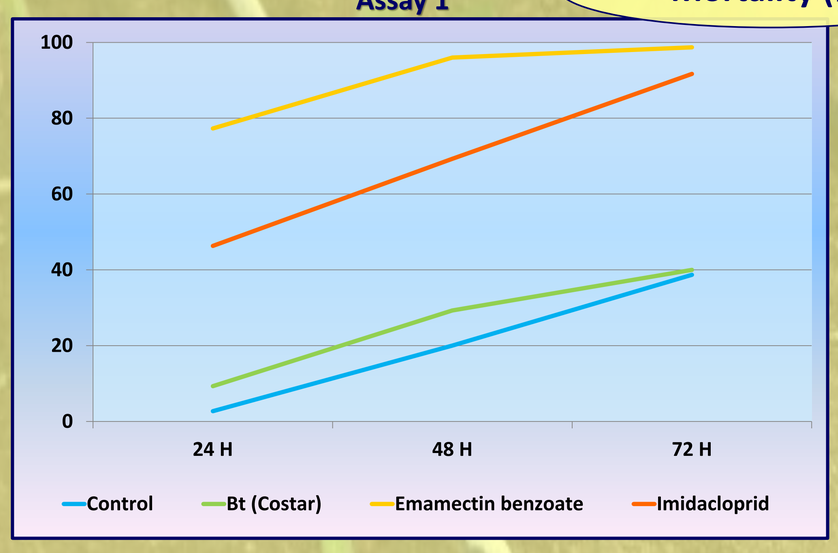


20-25 *Ephestia kuehniella* eggs per replicate were offered to 2 females during 24h (2nd and 3rd day)

Results

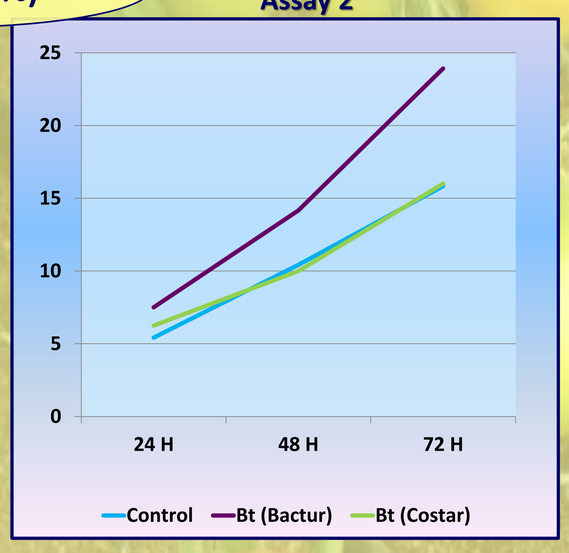
Mortality (%)

Assay 1



Commercial insects

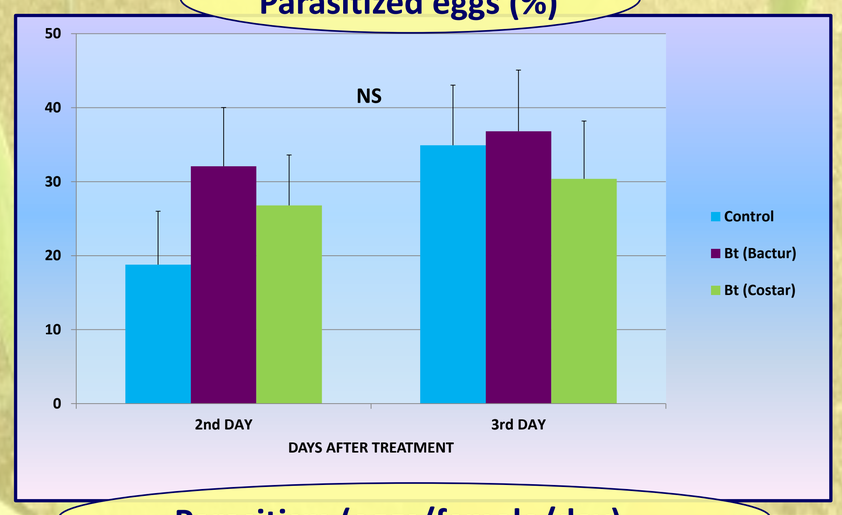
Assay 2



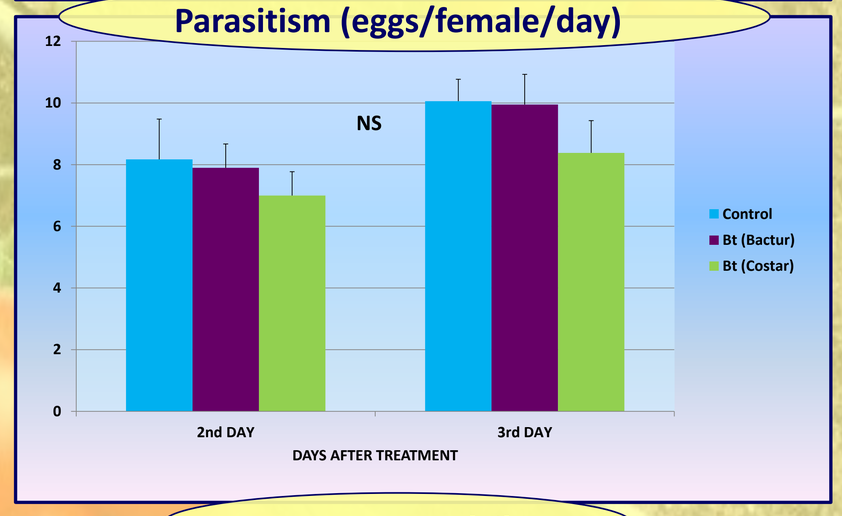
Laboratory reared insects

Parasitized eggs (%)

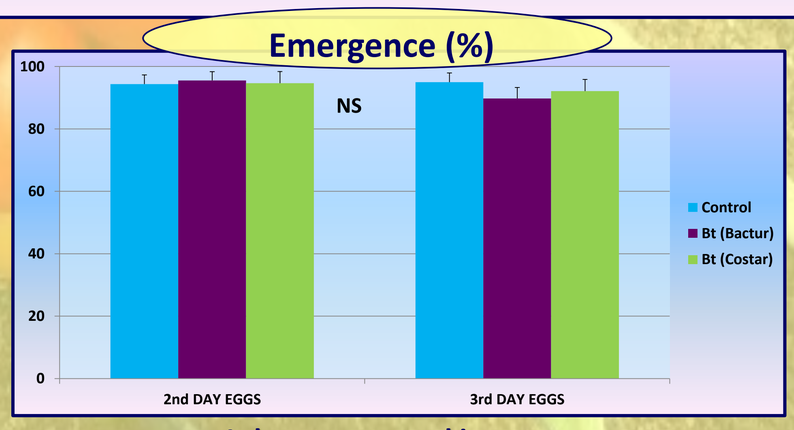
Assay 2



Parasitism (eggs/female/day)



Emergence (%)



Laboratory reared insects

Conclusions

Trichogramma achaeae

Treatments	Emamectin benzoate	Imidacloprid	*Bacillus thuringiensis* subsp. Kurstaki (Costar)	*Bacillus thuringiensis* subsp. Kurstaki (Bactur)
Final IOBC class [(1)]	3	3	1	1

[(1)] Harmless (1): reduction <30%, slightly harmful (2): reduction 30-79%, moderately harmful (3): reduction 80-99%, harmful (4): reduction >99%

- **Emamectin benzoate and imidacloprid were moderately harmful to the parasitoid *T. achaeae* due to the high mortality caused.**
- **Both *Bacillus thuringiensis* subsp. Kurstaki formulations were harmless to the parasitoid *T. achaeae* based on mortality, reproduction and adult emergence.**